INTERNATIONAL SECURITY POLICY BRIEF 01

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ACDIS

The Program in Arms Control, Disarmament, and International Security
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Policy Recommendations

- Recognize the economic, social, and political implications of emerging infectious diseases (EID), and be prepared to meet international security challenges presented by EID outbreaks with scientifically sound responses.
- Prioritize development of proactive, reliable EID dection methods as the first step to an effective response plan.
- Support research efforts in human and animal disease control strategies and tools that consider a variety of potential contexts in which they may be employed.
- Step up efforts in planning for recovery after an EID event to complement detection and response research. Develop new tools and methods in areas such as animal identification and epidemiology of rare events.

Recognizing that you have a problem is the first step to recovery. Proactive, reliable EID detection is paramount to an effective response plan.

Impacts of Emerging Infectious Disease Research on International Security Policy

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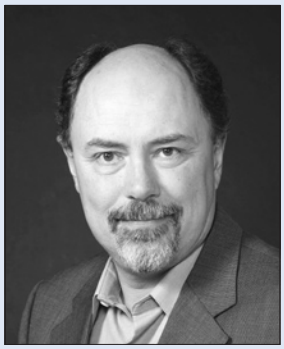
The international security implications of emerging infectious diseases (EID) are suggested by their various definitions. Morse defined emerging diseases as "...infections that have newly appeared in a population or have existed but are rapidly increasing in incidence or geographic range" (Morse 1995). Applied to animals, this definition includes newly recognized diseases such as nipah virus infection of swine, old diseases that acquire new properties such as enteritis caused by multidrug resistant Salmonella enterica typhimurium DT104, and well-known diseases that appear in a new geographic region such as the recent introduction of West Nile virus (WNV) into North America. Transboundary diseases are a specific subset of potentially emergent plant and animal diseases defined by the Food and Agriculture Organization of the United Nations (1996) as "Those that are of significant economic, trade and/or food security importance for a considerable number of countries; which can easily spread to other countries and reach epidemic proportions; and where control/management, including exclusion, requires cooperation between several countries." These include some of the most significant diseases of livestock: foot-and-mouth disease (FMD), rinderpest, Rift Valley fever, African swine fever, avian influenza, etc. Finally we have diseases that must, by Morse's definition, be included as a subset of EID, those caused by bioterrorism (including agroterrorism or criminal activity) defined as "the use, or threatened use, of biological agents to promote or spread fear or intimidation upon an individual, a specific group, or the population as a whole for religious, political, ideological, financial, or personal purposes," with obvious political and security implications. Each of these definitions includes geopolitical elements, and the occurrence of an EID event may have important consequences for international security.

A National Intelligence Council estimate (2000) clearly describes some of the international economic, social and political implications of EID. Impairment of socioeconomic development in developing and former communist states could contribute to political instability, humanitarian crises and even military conflict in regions of interest to the U.S. The socioeconomic impacts of human disease are readily apparent. Yet it is important to note that most emerging diseases of humans are zoonotic, they are transmitted from animals to humans (Taylor, Latham, and Woolhouse 2001). The



Dr. Laegreid's research interests are focused on the pathogenesis and control of animal diseases, especially high consequence infections of livestock. He utilizes molecular, cellular, animal and population based studies to elucidate mechanisms of injury and susceptibility to viral and bacterial disease. Dr. Laegreid's recent work is directed towards understanding how genomic variation of hosts and pathogens interacts to influence the expression of disease at the population level. Dr. Laegreid is the author or co-author of over 75 peer reviewed scientific publications, as well as contributions to books, reports and other publications.

Dr. Laegreid obtained his BS, MS, DVM and PhD degrees from Washington State. In addition he completed a residency in anatomic pathology in the Washington Animal Disease Diagnostic Laboratory. After moving to the Plum Island Animal Disease Center he became Research Leader of the Molecular Pathology Unit, initiating pathogenesis and vaccine research primarily on arthropod borne transboundary diseases such as African horsesickness and Venezuelan equine encephalitis, as well as working with other exotic diseases such as African swine fever, and foot-and-mouth disease. Dr. Laegreid became Research Leader of the Animal Health Unit at the U.S. Meat Animal Research Center where he led research programs on zoonotic foodborne pathogens, and genomics of livestock disease, including *E. coli* O157:H7 and bovine spongiform encephalopathy. In 2007, he joined the faculty of the Department of Pathobiology, College of Veterinary Medicine at the University of Illinois at Urbana-Champaign.

impacts that animal EID may have on developing economies may be equally severe, especially where animals serve as sources of food and transportation, as well as acting as de facto banks or repositories of wealth. But EID can cause political problems even in developed countries as evidenced by the elimination of the Ministry of Agriculture, Forestries and Fisheries (MAFF, roughly the equivalent of the U.S. Department of Agriculture) due to furor over its response to a 2001 FMD outbreak in the U.K. Restrictions on trade and travel can also complicate international relations even between close allies, as the embargoes on U.S. beef exports to Japan and South Korea in response to three cases of Bovine Spongiform Encephalopathy (BSE, or mad cow disease) in the U.S. have clearly demonstrated. In the case of bioterrorism, if it can be shown to be the result of a state-sponsored group, the consequences are likely to be severe, probably resulting in retaliatory action. EID outbreaks may present serious international security challenges that require scientifically sound policy responses.

Research can contribute to the prevention or mitigation of EID

Research can contribute to the prevention or mitigation of EID at various levels. To paraphrase various self-help books, recognizing that you have a problem is the first step to recovery. Thus proactive, reliable EID detection is paramount to an effective response plan. Unfortunately, emerging diseases rarely make dramatic appearances. The earliest human cases of WNV in the U.S. were dismissed as other commonly occurring encephalitides without much fanfare. In fact, it took a veterinary pathologist investigating unusual mortality in wild and captive birds to recognize that this was something new, and even then she had trouble convincing public health officials that there was a potentially devastating new virus on the scene (U.S. General Accounting Office 2000). Currently, detection is largely based on lists of potential infectious agents based on their perceived threat, so-called select agent lists. This is prudent but insufficient because it is, in fact, impossible to know what the next EID will be. Regarding bioterrorism, Tony Cordesman (2001) has stated "From a public policy viewpoint, these uncertainties mean the US must prepare for a wide variety of low probability attacks..." Such preparation has not been a priority for either human or animal disease as efforts have been focused on the select agents. Advances in biotechnology may allow development of detection methods which are broad spectrum and require little or no prior knowledge of the causative agent.

Beyond actual detection methods, when faced with an unusual syndrome or prevalence of disease, one must ask the following questions:

1. is this a "new" disease or simply an unusual manifestation of something we know?;
2. is this a disease that emerged in situ or was it introduced?;
3. if introduced, what was the route and was the introduction accidental or intentional?
4. what is the current extent of the outbreak, what individuals/populations are most susceptible and how fast/far is it likely to spread?

The answers to these questions will determine the nature and magnitude of the policy response, from allocation of public health resources to mobilizing the military. These are difficult questions, made more so by the fact that policymakers and response agencies will need this information almost immediately. Our knowledge is currently quite limited regarding these questions and both research and field experience will be required to improve our decision-making capabilities.

One factor often overlooked in evaluating security risks associated with disease emergence is the nature of the response to a disease emergence event, particularly in light of concerns about biowarfare and agroterrorism. Responses which might be appropriate under one set of conditions could be inappropriate or even dangerous under other conditions. For example, the response to an outbreak of FMD in South Korea would be quite different were it thought to have been an intentional introduction from North Korea, rather than an accidental wind-borne introduction from China, with considerable difference in security impact (Joo et al. 2002). Another example is the armed resistance to FMD eradication efforts in Mexico between 1946 and 1952, by poor farmers whose livelihood was threatened by the control policy which forced them to replace draft oxen with donkeys, a response more palatable in temperate than subtropical climates (Shaw 1949). Unfortunately, much of the research into animal disease control strategies and the tools to support them has failed to consider a variety of potential contexts in which they may be employed (Perry and Sones 2007). Policies based on such research could be ineffective or even detrimental if applied inappropriately. To avoid these problems, EID response policy needs to be appropriate to the population, proportional, and as precise as possible.

Finally, planning for recovery after an EID event is an area that has received only limited consideration. In a scenario eerily similar to that playing out in Iraq, we have plans for detecting and attacking an EID event but very little sense of what to do after that. For example, the index case of BSE in the U.S. detected in December 2003 was dealt with as expeditiously as possible. The case was diagnosed, premises quarantined, the animal traced back to its Canadian origin within 48 hours, and many in contact animals promptly accounted for. However, in 2007, there are still markets closed to U.S. beef, and trade issues arising from that animal and two subsequent cases continue to be a source of friction with our trading partners, not to mention loss of market share for U.S. producers. The lack of planning for the aftermath of an EID event contributes to a lack of resilience in this segment of our economy, greatly increasing the economic and political impact of even a small and well-handled outbreak. Although much of the planning for post-EID resilience will not require laboratory research, development of new tools and methods is necessary in some areas such as animal identification and epidemiology of rare events.

The security impact of an EID event will vary both in magnitude and form depending on geography, economic status, importance of international trade, local and international political situations, among other factors. It is critical that these factors be considered in designing and interpreting EID research, if the fruits of that research are to be useful for reducing the security impact of a disease event. It is also important that researchers have the skills to communicate the strengths and limitations of EID prevention and control strategies to policy makers and stakeholders so that research is utilized effectively in the policy making process. However, integrating policy considerations into research will not happen without active advocacy and outreach on the part of the scientific community. Introducing students to policy considerations early in their research training, encouraging their participation in organizations involved in policy making and evaluating their research in part on its policy impact will be an initial step in this direction. Progress may be achieved through increasing awareness of security policy issues (and research opportunities) amongst established researchers through symposia, speakers, and direct interaction with policymakers and stakeholders. International security will be best served when EID research is informed by policy considerations and policy is based on sound EID research.

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ACDIS

Established at the University of Illinois at Urbana-Champaign in 1978, the Program in Arms Control, Disarmament, and International Security (ACDIS) is comprised of faculty, students, and visiting scholars drawn from diverse academic disciplines. Program affiliates pursue advanced research to address relevant issues in international security. ACDIS receives funding from the State of Illinois, private foundations, and federal government agencies.

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Editor's Note

This publication is the first in a planned series of periodic briefs addressing policy aspects of international security issues. Future briefs will cover a range of topics in the areas of biodefense, cybersecurity, energy security, nuclear nonproliferation, conflict management, and other subjects related to international peace and security policy. The primary aim of this series will be to highlight ongoing academic research at ACDIS and the University of Illinois that serves to inform federal and international policy decisions.

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